

Claims

1. Method for producing an electrically conductive connection between
5 an electrical terminal device (104) having a cut-out, such as a cable shoe, and a sheet metal part (50), in which a hollow fastener element (10) is rotationally fixedly riveted to the sheet metal part and an electrically conductive connection is hereby produced between the fastener element and the sheet metal part and the so manufactured
10 component assembly is subsequently provided with an electrically non-conductive or poorly-conductive protective coating (120) such as for example a paint layer or a powder coating, characterized in that
a mount (80) for the electrical terminal device (104) is formed in the
15 region of the end face (80) of the fastener element to which the electrical terminal device (104) is attached and prevents a rotation of the terminal device relative to the fastener element (10) and the sheet metal part (50) and in that a thread forming or thread cutting screw (106) is screwed through the cut-out (110) of the electrical terminal
20 device and into the hollow fastener element (10) and there forms or cuts a thread by the screw-in movement.
2. Method in accordance with claim 1,
characterized in that
25 the fastener element (10) is attached to the sheet metal part (50) so that it is secure against button-out.
3. Method in accordance with claim 1 or claim 2,
characterized in that

the fastener element (10) is self-piercingly attached to the sheet metal part.

4. Method in accordance with claim 1 or claim 2,
5 characterized in that
the mount (82) is formed by at least one projection (40, 41) which
projects beyond the end face of the fastener element.
5. Method in accordance with claim 3,
10 characterized in that
the fastener element is executed with two projections (40) which are
formed by two lugs having a spacing from one another and which are
arranged to the side of the bore of the hollow fastener element (10).
- 15 6. Method in accordance with claim 3,
characterized in that
the projection (41) is arranged around the bore (38) of the hollow
fastener element (10) and is made polygonal in its external outline.
- 20 7. Method in accordance with claim 5,
characterized in that
the projection (41) is made triangular, square, hexagonal or octagonal
in its external outline.
- 25 8. Method in accordance with claim 1 or claim 2,
characterized in that
the mount (80) is formed by a recess in the end face of the fastener
element which merges into one or more radially extending grooves.

9. Hollow fastener element for the electrically conductive attachment of an electrical terminal device (104) such as a cable shoe, to a sheet metal part,
characterized in that
- 5 the hollow fastener element (10) has a head part (14) and a rivet section (16), with the rivet section (16) merging via a contact surface (12) for the sheet metal part into the head part (14) and with features (30) providing security against rotation being provided at the contact surface and/or at the rivet section (16), wherein the hollow fastener
- 10 element has a bore, for example a smooth cylindrical bore (38), at a point at which a thread is to be formed by screwing-in a thread cutting or thread forming screw (106) and in that a mount (80) for the rotationally secure attachment of the electrical connection device (104) to the fastener element is provided at the end face of head part
- 15 (14) remote from the rivet section (16).
10. Fastener element in accordance with claim 9,
characterized in that
- 20 the mount (80) is formed by at least one projection (40; 41) projecting beyond the end face of the fastener element.
11. Fastener element in accordance with claim 9,
characterized in that
- 25 the fastener element (10) is executed with two projections which are formed by two lugs having a spacing from one another which are arranged to the side of the bore (38) of the hollow fastener element.
12. Fastener element in accordance with claim 10,
characterized in that

the projection (41) is arranged around the bore of the hollow fastener element and is made polygonal in its external outline.

13. Fastener element in accordance with claim 12,
5 characterized in that
the projection (41) is made triangular, square, hexagonal or octagonal in its external outline.
14. Fastener element in accordance with claim 9,
10 characterized in that
the mount (80) is formed by a recess in the end face of a fastener element which merges into one or more radially extending grooves.
15. Fastener element in accordance with one of the preceding claims 9 to
15 14,
characterized in that
a tubular guide section (18) is arranged concentric to the tubular rivet section (16) and radially inside the latter, with a ring gap (20) being provided between the guide section (18) and the rivet section
20 (16) and with the guide section projecting beyond the free end of the rivet section.
16. Fastener element in accordance with claim 15,
characterized in that
25 the free end of the wall of the ring-like rivet section (16) is rounded when viewed in an axial section plane both at the radially outer side (24) and also at the radially inner side (26) and has for example a semi-circular shape or a shape resembling an arrow-tip.
- 30 17. Fastener element in accordance with claim 15 or claim 16,

characterized in that
the ring gap (20) has a radial dimension in the range between 0 mm
and approximately 3 mm.

- 5 18. Fastener element in accordance with one of the preceding claims 15
to 17,
characterized in that
the ring gap (20) finishes at an axial spacing (a) before the ring-like
contact surface (12) at the rivet section side of the ring-like contact
10 surface (12).
19. Fastener element in accordance with one of the preceding claims 15
to 18,
characterized in that
15 the guide section (18) is formed as a piercing section and has a ring-
like cutting edge (28) at its end remote from the contact surface (12).
20. Fastener element in accordance with one of the preceding claims 15
to 19,
20 characterized in that
features (30) providing security against rotation are disposed in the
region of the ring-like contact surface (12) and/or at the rivet section
(16) and/or at the jacket surface of the head part (14) adjacent to the
contact surface (12).
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21. Fastener element in accordance with claim 20,
characterized in that
features (30) providing security against rotation are formed by noses
or by groove-like recesses.

22. Fastener element in accordance with claim 21, in which noses (30) providing security against rotation are provided and are present in raised form at the contact surface (12) and at the rivet section (16) in the region of the transition from the contact surface to the rivet section.
23. Fastener element in accordance with claim 22, characterized in that the noses (30) providing security against rotation extend in the radial direction at the contact surface (12) and in the axial direction at the rivet section (16).
24. Fastener element in accordance with one of the claims 9 to 23, characterized in that the noses providing security against rotation have a generally rounded shape or are provided with side flanks (32) which lie in planes extending in the longitudinal direction of the element.
25. Fastener element in accordance with one of the claims 15 to 24, characterized in that the hollow fastener element has a hollow cylindrical region (38) where the thread forming or cutting screw forms or cuts a thread cylinder which is provided either in the head part (14) or in the guide section (18) or at least partly in the head part (14) and in the guide section (18).
26. Fastener element in accordance with claim 25, characterized in that

the thread cylinder ends in the axial direction approximately at the position where the ring-like gap (20) ends in front of the ring-like contact surface (18).

- 5 27. Fastener element in accordance with claim 11,
characterized in that
the projection is formed by at least one lug and in that the or each
lug (40) has a flank, which, on the attachment of a cable shoe, pre-
vents rotation of the latter about the longitudinal axis (11) of the
10 functional element (10).
28. Fastener element in accordance with claim 11 or 27,
characterized in that
at the position of the or each lug (40) the jacket surface of the head
15 part (14) has a corresponding recess (42) which, on the attachment of
the functional element to a sheet metal part (50), serves as a security
against rotation.
29. Fastener element in accordance with one of the preceding claims 9 to
20 14,
characterized in that
the rivet section is a piercing and riveting section, with the head part
and the piercing and riveting section being formed for example as in
the RSF element of the company Profil-Verbindungstechnik GmbH &
25 Co. KG or as described in the German patent specification 3446978
or 3447006.
30. Component assembly consisting of a sheet metal part (50) and a
hollow fastener element (10) attached to it via a rivet connection,
30 wherein the fastener element is rotationally fixedly secured to the

sheet metal part by means of features (30) providing security against rotation and the fastener element and the sheet metal part are jointly coated with an electrically non-conductive or poorly conductive protective coating (120) and an electrically conductive path is provided between the fastener element and the sheet metal part in the region of the rivet connection and/or the features providing security against rotation,

characterized in that

the fastener element has a smooth cylinder bore (38) for receiving a thread forming or cutting screw and in that the fastener element has a mount (80) at the end face remote from the rivet connection for the rotationally secure attachment of the electrical terminal device (104).

31. Component assembly in accordance with claim 30,

characterized in that

a thread cutting or forming screw (106) is screwed into the hollow fastener element (10) and holds the electrical connection device at the fastener element (10) in the manner secure against rotation.

32. Component assembly in accordance with claim 30 or 31,

characterized in that

the mount (80) is formed by at least one projection (40; 41) projecting beyond the end face of the fastener element.

33. Component assembly in accordance with claim 32,

characterized in that

the fastener element is executed with two projections (40) which are formed by two lugs having a spacing from one another which are disposed to the side of the hole (38) of the hollow fastener element.

34. Component assembly in accordance with claim 32,
characterized in that
the projection (41) is arranged around the bore (38) of the hollow
fastener element (10) and is made polygonal in its external outline.

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35. Fastener element in accordance with claim 34,
characterized in that
the projection (41) is made triangular, square, hexagonal or octagonal
in cross-section.

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36. Fastener element in accordance with claim 31 or 32,
characterized in that
the mount (80) is formed by a recess in the end face of the fastener
element which merges into one or more radially extending grooves.

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